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body should be free to use its judgment for the best interests of the individual student. Rules and precedents have their value for the regular progress of the student body, but must be considered a means and not an end. Justice to the individual is our fundamental duty. Broadly considered, just action for the individual carries with it justice to the other schools and to the public. We must beware lest in our blindness and in our sloth and in our preoccupation we bow down to the wood and stone of rules and regulations. Let us set up rather the god of individual education, which is a spirit and not a formula; the spirit which so successfully wrought in medical education in the days of preceptor and student; the spirit which has produced such apparent prodigies as Carl Witte and young Sidis; the spirit which makes an educational institution, not a machine nor a purely reflex organism, but a human entity with a human soul.

E. P. LYON

THE GEOGRAPHICAL DISTRIBUTION OF
THE STUDENT BODY AT A NUMBER
OF UNIVERSITIES AND COLLEGES

THE accompanying table explains the geographical distribution of the student body of twenty-four American universities, five New England colleges for men, five colleges for women, one eastern and one western school of technology and one Pennsylvania college and engineering school, for the academic year 1910-11, the summer session students being omitted in every instance. The corresponding figures for 1909-10 were not compiled; those for 1908-9 may be consulted in the issue of SCIENCE for October 1, 1909, those for 1907-8 in the issue for October 30, 1908, those for 1906-7 in the issue for July 26, 1907, and those for 1904-5 in the issue for October 6, 1905. To the table for 1909-10

have been added the University of Syracuse, the University of Texas and Washington University, St. Louis.

Comparing the attendance by divisions of six eastern universities (*Columbia, Cornell, Harvard, Pennsylvania, Princeton, Yale*) with the corresponding figures for the same universities in 1908-9, we note that there has been a gain for these universities, taken as a whole, in every division, the largest increase in the actual number of students, leaving the North Atlantic division—in which all of these six universities are located—out of consideration, having been recorded in the North Central division, where there has been a gain of 310 students. The South Atlantic division comes next, with an increase of 126 students, followed by the Western division with a gain of 117 students, the South Central with 89, foreign countries with 27 and insular and non-contiguous territories with 23. The total increase in divisions outside of the North Atlantic in the two years under comparison is 692, as against a total increase of 527 in 1908-9 over 1906-7. Calculated on a percentage basis, the total gain of the six universities in the North Atlantic division between 1909 and 1911 amounted to 11.6 per cent., as against a gain of 13.3 per cent. outside of the division mentioned. In 1908-9 the percentage of increase in the North Atlantic division over 1906-7 was 7.6 per cent., as against a gain of 11.4 per cent. in the other divisions combined. In the North Atlantic, South Atlantic and North Central divisions and in the insular and non-contiguous territories all of the six universities with the exception of *Yale* show an increase in 1911 over 1909; in the South Central division all of the six institutions have made gains, in the Western division all show an increase except *Princeton*, while in foreign countries all have

experienced gains except *Pennsylvania*. Comparing the figures for 1910-11 with those for 1904-5, we observe that the most substantial gains have been made by *Pennsylvania* (96), *Columbia* (92) and *Cornell* (63), in the South Atlantic division; by *Columbia* (61), in the South Central division; by *Columbia* (252), *Cornell* (175), *Harvard* (132) and *Pennsylvania* (64) in the North Central division; by *Harvard* (60) and *Yale* (52) in the Western division; and by *Pennsylvania* (79), *Columbia* (74), *Cornell* (61) and *Harvard* (60) in foreign countries.

Of the western universities, *Michigan* has by far the strongest hold on the North Atlantic division, attracting 638 students (as against 394 in 1905), to *Wisconsin's* 96, *Ohio's* 86, *Illinois's* 76 (36 in 1905), *Northwestern's* 64, *Stanford's* 49 and *California's* 34. Of the universities *Harvard* leads in all of the New England states with the exception of Connecticut, where *Yale* has the largest following, and of Vermont, where *Syracuse* is in the lead. *Columbia* naturally has a considerable lead in New York and New Jersey, while *Pennsylvania* of course leads in its own state. In New York *Columbia* is followed by *Syracuse*, *Cornell*, *Yale*, *Harvard*, *Michigan*, *Princeton*, *Pennsylvania*. In New Jersey *Columbia* is followed by *Pennsylvania*, *Princeton*, *Cornell*, *Yale*, *Harvard*, *Syracuse*. In Pennsylvania the University of *Pennsylvania* is followed by *Cornell*, *Princeton*, *Yale*, *Harvard*, *Columbia*, *Michigan*, *Syracuse*.

Examining next the attendance of the group of male colleges and technical schools, we note that the order for the North Atlantic division is *Massachusetts Institute of Technology*, *Dartmouth*, *Lehigh*, *Williams*, *Amherst*, *Wesleyan*, *Bowdoin*, *Purdue*. *Wesleyan* naturally leads in Connecticut, *Bowdoin* in Maine, *Massa-*

chusetts Institute of Technology in Massachusetts, *Dartmouth* in New Hampshire and Vermont and *Lehigh* in New Jersey and Pennsylvania. *Williams* leads in New York state and *Massachusetts Institute of Technology* in Rhode Island. 27 per cent. of the students at *Amherst*, as against 43 per cent. in 1906, have their permanent home in Massachusetts; *Bowdoin* attracts 74 per cent. of its student body from Maine, as against 77 per cent. in 1908; 27 per cent. of *Dartmouth's* students, as against 21 per cent. in 1906, hail from New Hampshire and Vermont; the *Massachusetts Institute of Technology* attracts 56 per cent. of its student body from Massachusetts, as against 55 per cent. in 1908; 20 per cent. of *Wesleyan's* students, as against 35 per cent. in 1908, claim Connecticut as their permanent home, while *Williams* enrolls 22 per cent. of its student body from Massachusetts. The latter institution attracts almost twice as many students from New York as from Massachusetts; *Amherst* also attracts more students from the Empire state than from Massachusetts, and *Dartmouth* attracts almost twice as many from Massachusetts as from New Hampshire. 56 per cent. of *Lehigh's* student body hail from Pennsylvania, as against 60 per cent. in 1906, while 76 per cent. of *Purdue's* students claim Indiana as their permanent residence, this figure having remained stationary since 1908.

Of the eastern universities, *Syracuse* possesses the largest percentage of enrollment from its own state, namely, 86 per cent; it is followed by *Pennsylvania* with an enrollment of 67 per cent. from its own state, the same as in 1906. *Columbia's* percentage of New York students has dropped from 66 per cent. in 1906 to 62 per cent. in 1911; *Virginia* attracts 57 per cent. of its clientele from its own state, as

against 53 per cent. in 1908; *Cornell's* percentage of New York students has dropped from 56 per cent. in 1906 to 55 per cent. in 1911; of *Harvard's* students 50 per cent., as against 54 per cent. in 1906, are residents of Massachusetts; of the students of *Johns Hopkins* 41 per cent. are residents of Maryland, as against 43 per cent. in 1909; of *Yale's* students 35 per cent., as against 33 per cent. in 1906, have their home in Connecticut; and of *Princeton's* student body only 21 per cent., as against 20 per cent. in 1906, are residents of the state of New Jersey.

Coming to the South Atlantic division and taking into consideration only the six eastern universities mentioned in the beginning of the article, we note that the order is *Pennsylvania, Cornell, Columbia, Harvard, Princeton* and *Yale*—*Pennsylvania* and *Cornell*, and *Princeton* and *Yale* having changed places since 1905. Of the remaining eastern universities *Virginia* and *Johns Hopkins* naturally have the largest following in this division, while of the western institutions only *Michigan* makes a good showing here. Of the colleges *Lehigh* has the best representation, its main strength lying in Maryland. As for the standing in individual states, *Pennsylvania* naturally leads in Delaware and *Johns Hopkins* in Maryland; *Cornell* leads in the District of Columbia, *Pennsylvania* in Florida and North Carolina, *Columbia* in Georgia and South Carolina and *Ohio State* in West Virginia. *Princeton* is second in Delaware, *Cornell* in Maryland and *Johns Hopkins* in Virginia.

In the South Central division *Texas* naturally heads the list, followed by *Columbia* (133, as against 72 in 1905), *Virginia* (127), *Harvard* (113–88), *Michigan* (97–64), *Cornell* (91–76), *Yale* (90–80) and *Missouri*. *Purdue*, *Massachusetts Institute of Technology* and *Wellesley* draw

over 30 students each from this division. The largest representation from individual states is found at the following universities. Alabama: *Columbia, Harvard* and *Virginia*; Arkansas: *Missouri, Northwestern*; Kentucky: *Michigan, Harvard* and *Princeton* and *Yale*; Louisiana: *Virginia, Cornell* and *Johns Hopkins*; Mississippi: *Columbia, Virginia*; Oklahoma: *Missouri, Kansas, Michigan*; Tennessee: *Columbia, Cornell* and *Virginia*; and Texas: *Texas, Virginia, Columbia* and *Harvard* and *Yale*.

In the North Central division the order for the institutions located in that region is *Minnesota, Nebraska, Wisconsin, Illinois, Michigan, Northwestern, Ohio State, Missouri, Indiana, Kansas, Iowa, Purdue, Washington*. All of these of course have a larger patronage in this division than any of the eastern universities, which come in the order *Harvard, Cornell, Yale, Columbia, Pennsylvania, Princeton, Johns Hopkins, Syracuse, Virginia*. Since 1905 *Cornell* and *Yale*, and *Pennsylvania* and *Princeton* have exchanged places. *Columbia's* representation in this group of states has grown from 262 to 514 in six years, *Cornell's* from 381 to 556, *Harvard's* from 526 to 658, *Pennsylvania's* from 139 to 203, *Yale's* from 506 to 523, while *Princeton's* has dropped from 209 to 190. Leaving the state institutions out of consideration in each case, *Wisconsin* is seen to have the largest following in Illinois, being followed by *Michigan, Cornell, Yale, Harvard, Smith*. *Illinois* leads in Indiana, and is followed in that state by *Northwestern, Michigan, Columbia, Wisconsin, Harvard, Cornell*. In Iowa the order is *Northwestern, Wisconsin, Illinois, Nebraska, Michigan, Harvard*; in Kansas: *Northwestern, Michigan, Illinois, Harvard, Columbia, Yale*; in Michigan: *Northwestern, Wisconsin, Columbia, Illinois, Harvard, Yale*; in Minnesota: *Northwestern,*

[illegible]

Foreign Countries	United States																																			
	California	Columbia	Cornell	Harvard	Illinois	Iowa	Johns Hopkins	Kansas	Michigan	Minnesota	Missouri	Nebraska	Northwestern	Ohio State	Pennsylvania	Princeton	Stanford	Syracuse	Texas	Virginia	Washington	Wisconsin	Yale	Ambertst	Bowdoin	Dartmouth	Lehigh	Mass. Inst. Tech.	Purdue	Wesleyan	Williams	Bryn Mawr	Mt. Holyoke	Smith	Vassar	Wellesley
	16	67	49	60	31	2	11	1	84	8	10	8	41	1	62	8	7	14				3	18	31	1	1	13	37	4	1	1	4	2	3	4	
North America...	9	53	19	52	17		10	2	25	3	3	3	35	2	21	7	4	7				2	12	30	1	1	3	18	4	1		4		3	4	
Central America...	2	3	2	2	1	1	1	1	1	1	5	1	4	2	13	4			7			1	1	1	2	2	6	9	2		1					
Cuba...	7	8	17	23	13	1	1	1	5					2	11	3	3				1	5				4	4	9	2							
Mexico...	1	1	1	1	1										7	1	1										1	1								
Newfoundland...									3				2																							
West America...	4	2	23	4	6				10	2	2	1	4	6	38	1	1	1				2	2	1			3	14	2							
Argentina Rep...	1	1	2	8	1				3				3	5		1	3					1		1		2	5	4								
Brazil...					3				2				1		38												2	2								
British Guiana...	3	1	1						1				1			1	1										3									
Chili...					1				2																											
Colombia...					1																															
Dutch Guiana...					1																															
Ecuador...			3																								1									
Ecuador...			6		1				2																											
Paraguay...			2																																	
Peru...			1																																	
Uruguay...	18	48	21	43	31	4	4	2	14	1	6	1	25	7	52	3	6	6				5	14	14	1	1	11	3	3	3	11	3	3	11	3	1
Europe																																				
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Wisconsin, Harvard, Yale, Illinois, Columbia, Michigan; in Missouri: Kansas, Illinois, Northwestern, Yale, Harvard, Michigan, Columbia, Cornell; in Nebraska: Northwestern, Michigan, Harvard, Illinois, Columbia and Cornell; in North Dakota: Minnesota, Northwestern, Wisconsin, Illinois, Harvard and Michigan; in Ohio: Michigan, Harvard, Cornell, Yale, Columbia, Purdue, Smith; in South Dakota: Northwestern, Wisconsin, Minnesota, Michigan, Illinois, Iowa; in Wisconsin: Northwestern, Minnesota, Illinois, Michigan, Columbia, Harvard, Vassar. It will thus be seen that *Northwestern* is mentioned as first in no less than seven of the twelve states included in this division. Of the male colleges and technical schools the order is *Purdue*, *Massachusetts Institute of Technology*, *Dartmouth*, *Williams*, *Amherst*; of the girls' colleges *Smith*, *Vassar*, *Wellesley*, *Bryn Mawr*, *Mount Holyoke*, the first three mentioned all having a larger representation from this division than either *Pennsylvania* or *Princeton*.

In the Western division (leaving *California* and *Stanford* out of consideration), *Michigan* is still in the lead, with *Harvard*, *Columbia*, *Northwestern*, *Yale* and *Cornell*, each of which attracts over one hundred students from this division, following. *Michigan's* representation has grown from 134 to 229 since 1905; *Harvard's* from 126 to 186; *Columbia's* from 111 to 152; *Yale's* from 78 to 130; *Cornell's* from 76 to 119; *Illinois's* from 41 to 89; *Pennsylvania's* from 22 to 71; while *Princeton's* has dropped from 41 to 31. *Northwestern* leads in Arizona; *Illinois* in Idaho; *Michigan* in Nevada and New Mexico; *Nebraska* in Wyoming. In California the order is *Harvard*, *Columbia*, *Michigan*, *Yale*; in Colorado: *Michigan*, *Harvard*, *Cornell*, *Yale*; in Montana: *Michigan*, *Wisconsin*, *Northwestern*, *Minnesota*; in Oregon:

Michigan, *Harvard*, *Columbia* and *Northwestern* and *Yale*; in Utah: *Northwestern*, *Cornell*, *Harvard*, *Columbia*; in Washington: *Harvard*, *Columbia* and *Michigan*, *Yale*.

Taking only the six eastern universities mentioned at the beginning of the article into consideration, and counting ties in fractions, we find that *Harvard* leads in $20\frac{2}{3}$ states of the Union, *Columbia* in $12\frac{5}{6}$, *Cornell* in $6\frac{1}{2}$, *Yale* in $4\frac{2}{3}$, *Pennsylvania* in 4 and *Princeton* in $\frac{1}{3}$.

Cornell maintains its lead in the number of students from insular and non-contiguous territories, being followed by *California* and *Pennsylvania*. *California* leads in Alaska and the Hawaiian Islands, *Cornell* in the Philippines and Porto Rico and *Northwestern* and *Virginia* in the Canal Zone.

The number of foreign students at American institutions of higher learning continues to show a noteworthy increase. There are enrolled at the group of six eastern universities mentioned at the beginning of the article 821 foreigners, as against 540 in 1905. At the twenty-one universities represented in the tables for 1908-9 and 1910-11 there were in attendance 1,296 foreigners in the former year as against 1,536 in the latter. At the twelve universities represented in the tables for 1906-7 and 1910-11 there were in attendance 898 students from foreign countries in the former year, as against 1,311 in the latter. Adding the foreign clientele of the colleges and technical schools in the table, we find that thirty-seven American institutions attracted no less than 1,782 foreigners during the academic year 1910-11, this figure being, as all the other comparisons have been, exclusive of the summer session attendance. In 1908-9 thirty-four of these institutions attracted 1,467 foreigners, while the same

institutions in 1910-11 had a foreign enrollment of 1,736 students. Taking the representation of foreigners at all of the thirty-seven institutions included in the table, we find that the largest delegations have been sent by the following countries: Canada 344, China 330, Japan 197, Mexico 193, Turkey (in Europe and Asia) 84, India 73, Great Britain and Ireland 72, Cuba 62, Germany 48, Russia 48 and Australia 47. Omitting the foreigners of the three institutions not included in the table for 1908-9 and comparing the foreign enrollment for the year mentioned with that of 1910-11, we secure the following results, the first figure mentioned in each case being that for 1911, the second that for 1909: Canada 335-242, China 326-193, Japan 193-158, Mexico 92-81, Turkey 82-51, India 71-60, Great Britain and Ireland 71-71, Cuba 55-70, Germany 47-56, Russia 46-50 and Australia 47-43. Owing to the fact that *Pennsylvania* did not separate the students from South America into the individual countries from which they hailed, it is impossible to determine whether the Argentine Republic should be included in the above list of countries with a representation of 46 or over. 548 of the 1,782 foreigners at the thirty-seven institutions in the present table hailed from North America, 132 from South America, 351 from Europe, 662 from Asia, 37 from Africa and 52 from Australasia. Omitting the three institutions (*Syracuse*, *Texas* and *Washington*) not included in the table for 1909 and comparing the figures for the two years in question, we find that between 1909 and 1911 the representation from North America increased from 460 to 531, that from Europe from 313 to 340, that from Asia from 458 to 651, that from Africa from 18 to 37, while that from South America decreased from 154 to 125, and that from

Australasia from 64 to 52, the largest increase thus having taken place in Asia.

If we compare the foreign clientele of twenty-one of the leading American universities,¹ with that of the twenty-one German universities, we find that America is still far behind Germany in the matter of attracting foreign students to its higher institutions of learning. During the winter semester of 1910-11, the twenty-one German universities attracted altogether no less than 4,672 students from foreign countries, as against 1,576 foreigners at the American universities mentioned. The latter figure would no doubt be slightly increased in case the University of *Chicago*, for which geographical distribution figures are unfortunately not available, were substituted for one of the smaller middle western universities. The German universities draw 4,046 students from other European countries, 398 from North and South America, 203 from Asia, 20 from Africa and 5 from Australasia, while the American universities attract 478 students from North American countries outside of the United States, 112 from South America, 318 from Europe, 587 from Asia, 32 from Africa and 49 from Australasia, in other words, the American universities lead in every continent with the exception of Europe. Almost half of the European foreigners at German universities hail from Russia, namely, 1,998 out of 4,046, this country being followed by Austria-Hungary with 760, Switzerland with 353, Bulgaria with 159, Great Britain and Ireland with 142, Rumania with 137, Greece with 83, Servia with 78, Luxemburg with 61 and Turkey with 57, the remaining countries

¹ California, Columbia, Cornell, Harvard, Illinois, Iowa, Johns Hopkins, Kansas, Michigan, Minnesota, Missouri, Nebraska, Northwestern, Ohio State, Pennsylvania, Princeton, Stanford, Syracuse, Washington, Wisconsin, Yale.

sending less than fifty students each. Among European countries the twenty-one universities of the United States lead only in Denmark (12 *vs.* 11), the American figures in European countries mentioned above being in every case far below the German figures, namely Russia 44, Austria-Hungary 11, Switzerland 7, Bulgaria 5, Great Britain and Ireland 61, Rumania 2, Greece 4, Servia and Luxemburg 0 and Turkey 38. Almost a third of the foreign students in attendance on German universities are at the University of *Berlin*, namely, 1,492 out of 4,672. *Berlin* is followed by the following universities in the order given: *Munich* 845, *Leipzig* 634, *Halle* 285, *Heidelberg* 186, *Königsberg* 185 (of whom 179 hail from Russia), *Göttingen* 141, *Freiburg* 127, *Jena* 119, *Bonn* 117, *Breslau* 107, *Strassburg* 105, the remaining institutions all attracting less than one hundred foreigners each. Figured on a percentage basis we find that 8.5 per cent. of Germany's 54,823 university students are foreigners, whereas only 2.1 per cent. of 74,325 students attending the twenty-one American universities mentioned hail from foreign countries. It should be borne in mind that the American institutions in every instance include an undergraduate academic department and in most instances a technical school, which is not the case for the German universities, but the comparison here outlined undoubtedly conveys a fairly accurate idea of the situation.

Of the three middle western universities that were included in the table for 1904-5, *Illinois* shows a gain in students from foreign countries during the six years of 120, *Michigan* of 62 and *Indiana* a loss of 3, while the total increase in foreign students during the same period at the nine universities included in the above table amounts to 460.

Examining the foreign delegations of the different American institutions by continents, we observe that the order in North America is *Columbia, Pennsylvania, Harvard, Cornell*; in South America: *Pennsylvania, Cornell, Massachusetts Institute of Technology, Michigan*; in Europe: *Pennsylvania, Columbia and Harvard, Illinois*; in Asia: *California, Columbia, Illinois, Cornell*; in Africa: *Cornell, Northwestern and Pennsylvania*; and in Australasia: *Pennsylvania, Northwestern*. In the countries that send at least ten students to any one institution, the order is as follows: Canada: *Columbia, Harvard, Northwestern*; Central America: *Pennsylvania, Cornell, Massachusetts Institute of Technology*; Cuba: *Cornell, Pennsylvania, Syracuse*; Mexico: *Illinois, Pennsylvania, Massachusetts Institute of Technology*; Germany: *Columbia, Harvard and Pennsylvania*; Great Britain and Ireland: *Pennsylvania, Columbia and Illinois and Bryn Mawr*; Russia: *Illinois, Northwestern, California and Harvard*; China: *Cornell, Columbia and Illinois, Wisconsin*; India: *California, Harvard, Northwestern*; Japan: *California, Columbia, Illinois*; Turkey: *Yale, Illinois, Columbia*; and Australia: *Pennsylvania, Northwestern*.

RUDOLF TOMBO, JR.

COLUMBIA UNIVERSITY

THE SMITHSONIAN EXPEDITION TO STUDY THE HEAT OF THE SUN

DIRECTOR ABBOT, of the Smithsonian Astrophysical Observatory, has just returned from a five months' astronomical expedition to Bassour, Algeria. The object of the expedition was to confirm or disprove the supposed variability of the sun. The Astrophysical Observatory has been for seven years making observations on Mt. Wilson, in California, on the daily quantity of heat received from the sun. The observations are arranged in such a manner as to indicate not only the quantity